

**REMARKS**

**I. Status of the Claims**

Claims 1-66 are pending. No claim has been amended. Applicants thank the Examiner for withdrawing the rejection of claims 24-41 and 66 under 35 U.S.C. § 112, second paragraph.

**II. Rejections Under 35 U.S.C. §§102/103**

Claims 1-66 stand rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over, French Patent Application No. 2,795,953, to Dubief ("Dubief") for reasons of record. Final Office Action at 2.

***Anticipation***

The present claims (e.g., claim 1) recite a detergent and conditioning composition comprising, in a cosmetically acceptable medium, at least one anionic surfactant, at least one other surfactant chosen from amphoteric, nonionic, and cationic surfactants and at least one polysaccharide chosen from starch hydrolysates with a dextrose equivalent of less than 20 and from nonionic and anionic fructans. Dubief discloses in Example 1 a cosmetic composition comprising lauryl ether sulfate with 2.2 moles of ethylene oxide (anionic surfactant), cocoylbetaine (amphoteric surfactant), a cationic inulin (i.e., quaternized with 3-chloro-2-hydroxypropyl-trimethylammonium), as well as other ingredients. Dubief, page 42 of translation. The Examiner asserts "that the cationic inulin disclosed in Example 1 of Dubief et al meets the limitation of a polysaccharide chosen from starch hydrolysates with a dextrose equivalent of less than 20." Final Office Action at 3. Further, the Examiner notes that "dependent claim 18 of

the instant application recites that the one polysaccharide is an inulin, which is clearly taught by Dubief et al in example 1, since a cationic inulin is an inulin.” *Id.*

Applicants disagree. The disclosure of a *cationic* inulin does not meet the limitations of present claim 1, i.e., at least one polysaccharide chosen from (1) starch hydrolysates with a dextrose equivalent of less than 20 and from (2) nonionic and (3) anionic fructans.” In particular, and in contrast to the Examiner’s assertion, inulin quaternized with 3-chloro-2-hydroxypropyltrimethylammonium is a polysaccharide, but is *not* a starch hydrolysate with a dextrose equivalent of less than 20 and thus, does not meet limitation (1). Specifically, inulins are fructans, which are carbohydrate polymers comprised of fructose repeating units, but starches are carbohydrate polymers comprised of amylose and amylopectin. See definitions of “fructan” and “inulin” (International Cosmetic Ingredient Dictionary and Handbook, 700, 872-873 (Tara E. Gottschalck, et al. ed., The Cosmetic, Toiletry, and Fragrance Assoc. 2004) (1973)) and definition of “starch” (Richard J. Lewis, Sr., Hawley’s Chemical Dictionary, 1085-86 (Van Nostrand Reinhold) (12th ed. 1993) (1930)), attached as Appendices 1 and 2. Further, the fructans taught by Dubief do not meet limitations (2) or (3) because they are cationic fructans.

The Examiner noted that dependent claim 18 recites that the at least one polysaccharide is an inulin. However, claim 18 depends from claim 1, and therefore has all of the limitations of the base claim. Because the fructans recited in claim 1 are limited to nonionic and anionic fructans and inulin is a fructan, the inulins of claim 18 are also limited to nonionic and anionic fructans. Accordingly, the cationic inulin disclosed by Dubief does not meet the limitations of claim 18.

For at least the reasons stated above, claims 1-66 are not anticipated by Dubief and withdrawal of the rejection of claims 1-66 under 102(b) is respectfully requested.

***Obviousness***

In addition to not being anticipated, claims 1-66 are not rendered obvious by Dubief either. To make a *prima facie* case of obviousness, an Examiner must cite a reference or references which (a) disclose all the elements of the claimed invention, (b) suggest or motivate one of skill in the art to combine or modify those elements to yield the claimed combination, and (c) provide a reasonable expectation of success should the claimed combination be carried out. See, e.g., *Northern Telecom Inc. v. Datapoint Corp.*, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990); and *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988). Failure to establish any one of these three requirements precludes a finding of a *prima facie* case.

As stated above, Dubief does not disclose all of the elements of the claimed invention, i.e., specifically, at least one polysaccharide chosen from starch hydrolysates with a dextrose equivalent of less than 20 and from nonionic and anionic fructans. Further, the Examiner has not provided any suggestion or motivation as to why one of skill in the art would have substituted the cationic fructans of Dubief with an anionic or nonionic fructan. Finally, the Examiner has not provided any reasonable expectation of success that the nonionic and anionic fructans would function in the compositions of Dubief the same way as the disclosed cationic fructans.

Accordingly, claims 1-66 are not obvious over Dubief and withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

### III. Conclusion

In view of the foregoing remarks, Applicants submit that the present claims are neither anticipated nor rendered obvious in view of the art cited against this application. Applicants therefore request the timely allowance of the pending claims.

Please grant any additional extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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GARRETT & DUNNER, L.L.P.



Chantal Morgan D'Apuzzo

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Dated: March 16, 2006

#### Attachments:

Appendix (1): International Cosmetic Ingredient Dictionary and Handbook, 700, 872-873 (Tara E. Gottschalck, et al. ed., The Cosmetic, Toiletry, and Fragrance Assoc. 2004) (1973)).

Appendix (2): Richard J. Lewis, Sr., Hawley's Chemical Dictionary, 1085-86 (Van Nostrand Reinhold) (12th ed. 1993) (1930).

# APPENDIX 1

## Frangula Alnus Bark Extract (Cont.)

Buckthorn Extract HS 2520 G (Grau)  
Herbasol-Extract Buckthorn  
(Cosmetochem)  
Phytoderm UV Complex Glycolic (Universal  
Flavors)  
VT-007 Extract of Buckthorn (Vege-Tech)

**Chemical Class:** Biological Products

**Function:** Skin-Conditioning Agent -  
Occlusive

**Technical/Other Name:**  
Extract of Fraxinus Ornus Seed

**Trade Name Mixture:**  
Manna Ash seed ekstrakt (Harklinikken)

## FRANGULA ALNUS POWDER

**Definition:** Frangula Alnus Powder is a dried plant material derived from *Frangula alnus*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

**Technical/Other Names:**  
Buckthorn  
Rhamnus Frangula  
Rhanus Frangula

**Trade Name:**  
Logopant Faulbaumrinden Pulver (Logona)

## FRAXINUS EXCELSIOR LEAF EXTRACT

**CAS No.** 84625-28-5  
**EINECS No.** 283-402-0

**Definition:** Fraxinus Excelsior Leaf Extract is an extract of the leaves of the european ash, *Fraxinus excelsior*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

**Technical/Other Names:**  
European Ash Extract  
European Ash (Fraxinus Excelsior) Extract  
Extract of European Ash  
Extract of Fraxinus Excelsior

**Trade Name Mixtures:**  
Common Ash Extract HS 2950 G (Grau)  
Extrait de Frene PPE GP 20 (Yves Rocher)  
Herbasol Extract Ash (Cosmetochem)  
(Cosmetochem International Ltd.)  
Natupure Ash (E.U.K)

## FRAXINUS ORNUS SEED EXTRACT

**Definition:** Fraxinus Ornus Seed Extract is an extract of the seeds of *Fraxinus ornus*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

## FRAXINUS RHYNCHOPHYLLA EXTRACT

**Definition:** Fraxinus Rhynchophylla Extract is an extract of the cortex of *Fraxinus rhynchophylla*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Skin-Conditioning Agent - Miscellaneous

**Technical/Other Name:**  
Extract of Fraxinus Rhynchophylla

**Trade Name:**  
Fraxinus Cortex 100% Extract Powder,  
Premier (Premier Specialties)

## FREESIA ALBA FLOWER EXTRACT

**Definition:** Freesia Alba Flower Extract is an extract of the flowers of *Freesia alba*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Skin-Conditioning Agent - Miscellaneous

**Technical/Other Name:**  
Extract of Freesia Alba Flower

**Trade Name Mixtures:**  
Amidroxy 4 Flowers (Alban Muller)  
Amidroxy 4 Flowers (Alban Muller)

## FREESIA ARMSTRONGII EXTRACT

**Definition:** Freesia Armstrongii Extract is an extract of the whole plant of *Freesia armstrongii*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Cosmetic Astringent

**Technical/Other Name:**  
Extract of Freesia Armstrongii

## Trade Name Mixtures:

Actiphyte Freesia (Active Organics)  
Actiphyte Freesia BG50P (Active Organics)  
Actiphyte Freesia GL (Active Organics)  
Actiphyte Freesia Lipo S (Active Organics)

## FREESIA REFRACTA EXTRACT

**Definition:** Freesia Refracta Extract is an extract of the plant, *Freesia refracta*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

**Technical/Other Names:**  
Extract of Freesia Refracta  
Freesia Extract

**Trade Name Mixtures:**  
Cosflor Freesia HGS (A & E Connock)  
Freesia Extract (Cosmetic Developments)

## FRITILLARIA VERTICILLATA BULB EXTRACT

**Definition:** Fritillaria Verticillata Bulb Extract is an extract of the bulbs of *Fritillaria verticillata*. See "Regulatory and Ingredient Use Information," regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

**Technical/Other Name:**  
Extract of Fritillaria Verticillata

**Trade Name Mixture:**  
Baimo-Liquid E (Ichimaru Pharcos)

## FRUCTAN

**Definition:** Fructan is a homopolymer of Fructose (q.v.).

**Chemical Class:** Carbohydrates

**Function:** Skin-Conditioning Agent - Humectant

**Trade Name Mixture:**  
Fructan (Bioland)

## FRUCTOSE

**CAS Nos.**  
57-48-7 (D-Form)  
30237-26-4

**EINECS No.**  
200-333-3

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## a Edulis Seed Extract

### IA EDULIS SEED EXTRACT

**Definition:** Inga Edulis Seed Extract is an extract of the beans of *Inga edulis*. See *Regulatory and Ingredient Use Information*, regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

**Technical/Other Name:**  
Extract of Inga Edulis

**Trade Name Mixture:**  
Campo Inga (Campo)

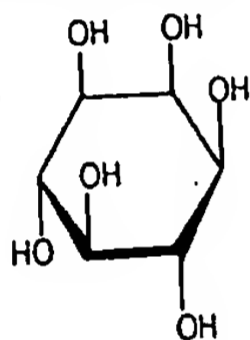
### INOSITOL

**CAS No.** 17-89-8 **EINECS No.** 201-781-2

**IPN Translation:**  
イノシトール

**Empirical Formula:**  
 $C_6H_{12}O_6$

**Definition:** Inositol is the cyclic polyol that conforms generally to the formula:



**Information Sources:** BRA, 21CFR107.10, 21CFR107.100, 21CFR184.1370, 21CFR250.102, 21CFR310.545, 21CFR582.5370, FCC, JCLS, JSCI, MAR, MI-13(5001), ROM, TSCA, USD

**Chemical Class:** Polyols

**Functions:** Hair Conditioning Agent; Humectant

**Reported Product Categories:** Moisturizing Preparations; Bath Oils, Tablets, and Salts; Cleansing Products (Cold Creams, Cleansing Lotions, Liquids and Pads); Night Skin Care Preparations; Skin Care Preparations, Misc.; Paste Masks (Mud Packs); Body and Hand Preparations (Excluding Shaving Preparations); Shampoos (Non-coloring); Tonics, Dressings, and Other Hair Grooming Aids

**Technical/Other Names:**  
Myoinositol  
Phaseomannitol

**Trade Name:**  
Myo-Inositol (Merck KGaA)

**Trade Name Mixtures:**  
Aquaderm (Crodarom)

Complex 5 - Vitaminic (Provital/Centerchem)  
Elespher Vitaplex Hydro (Laboratoires Serobiologiques)  
Extrapone #5 Special 2/032501 (Symrise)  
Extrapone 5 Special 2/789500 (Symrise)  
Follicusan (CLR)  
Hair Complex Aquosum (CLR)  
Hair Complex 20/70 n (CLR)  
Hair Complex NOVA (Crodarom)  
Lactil (Degussa Care Specialties)  
Neo-Haircomplex Special (Crodarom)  
Poly-Extract for Hair NOVA (Crodarom)  
Soluvit Richter (CLR)

### INOSITOL HEXA-PCA

**Empirical Formula:**  
 $C_{36}H_{42}N_6O_{12}$

**Definition:** Inositol Hexa-PCA is the hexaester of Inositol (q.v.) and PCA (q.v.).

**Chemical Classes:** Esters; Heterocyclic Compounds

**Function:** Skin-Conditioning Agent - Miscellaneous

**Technical/Other Name:**  
Meso-Inositol Hexapyrrolidone Carboxylate

### INULA BRITANNICA FLOWER EXTRACT

**Definition:** Inula Britannica Flower Extract is an extract of the flowers of *Inula britannica*. See *Regulatory and Ingredient Use Information*, regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Skin-Conditioning Agent - Emollient

**Technical/Other Name:**  
Extract of Inula Britannica Flower

**Trade Name Mixture:**  
Inulae Flos Extract (Maruzen Pharmaceuticals Co., Ltd.)

### INULA HELENIUM EXTRACT

**CAS No.** 84012-20-4 **EINECS No.** 281-666-1

**Definition:** Inula Helenium Extract is an extract of the elecampane, *Inula helenium*. See *Regulatory and Ingredient Use Information*, regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Information Source:** 21CFR172.510

**Chemical Class:** Biological Products

**Function:** Not Reported

**Reported Product Category:** Shampoos (Non-coloring)

**Technical/Other Names:**  
Elecampane Extract  
Elecampane (Inula Helenium) Extract  
Extract of Elecampane  
Extract of Inula Helenium

### Trade Name Mixtures:

Actiphyte of Elecampane BG50 (Active Organics)  
Actiphyte of Elecampane GL50 (Active Organics)  
Actiphyte of Elecampane Lipo S (Active Organics)  
Actiphyte of Elecampane PG50 (Active Organics)  
Aqueous Spray - Dried G Mix (Indena SA)  
Elecampane Extract (Kelisema Italy)  
Herbaliquid Alant Root Special (Crodarom)  
Herbasol Extract Elecampane Root (Alant) (Cosmetochem) (Cosmetochem International Ltd.)  
Vegebois of Elecampane (CEP (Solabia))  
VT-057 Extract of El Campane Root (Vege-Tech)

### INULA RACEMOSA ROOT POWDER

**Definition:** Inula Racemosa Root Powder is the powder derived from the roots of *Inula racemosa*. See *Regulatory and Ingredient Use Information*, regarding the labeling names for botanical ingredients in Volume 1, Introduction, Part A.

**Chemical Class:** Biological Products

**Function:** Not Reported

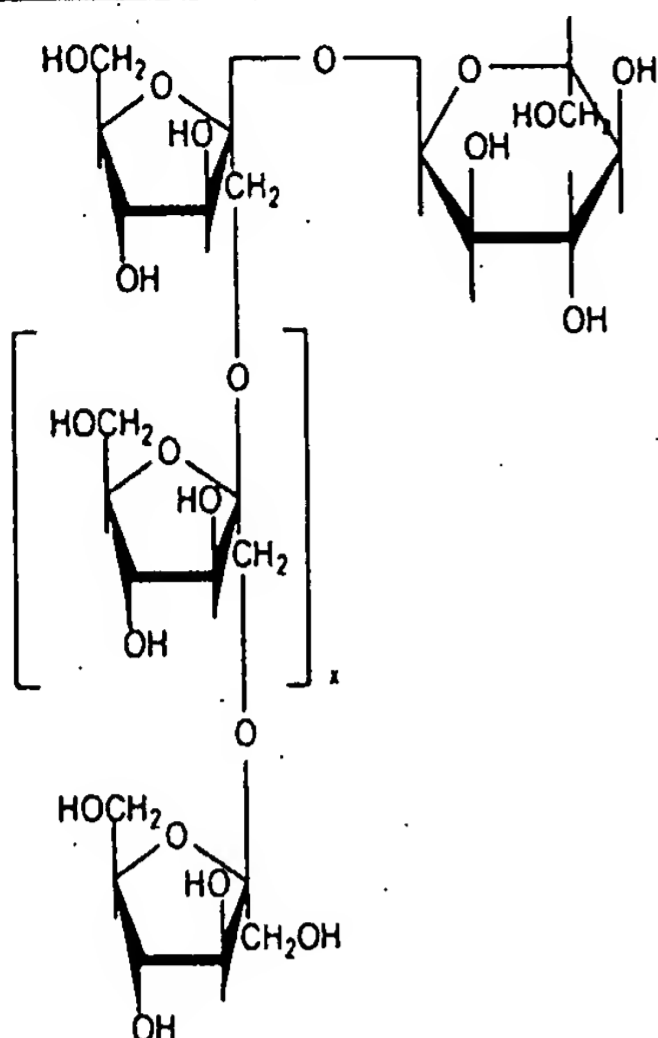
### INULIN

**CAS No.** 9005-80-5 **EINECS No.** 232-684-3

**Definition:** Inulin is the polysaccharide that conforms to the formula:

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International Cosmetic Ingredient Dictionary and Handbook



Information Source: MI-13(5025)

Chemical Class: Carbohydrates

Function: Skin-Conditioning Agent - Humectant

Technical/Other Names:

Alantin  
Fructosane  
Synantherin  
Synanthrin

Trade Name Mixture:

Glycacid INMA (Coletica SA)

#### IODIZED CORN PROTEIN

Definition: Iodized Corn Protein is the product of the reaction of corn protein with iodine.

Chemical Classes: Halogen Compounds; Proteins

Functions: Hair Conditioning Agent; Skin-Conditioning Agent - Miscellaneous

#### IODIZED GARLIC

Definition: Iodized Garlic is garlic, *Allium sativum*, powder that has been iodized.

Chemical Class: Biological Products

Function: Not Reported

Technical/Other Name:

Garlic, Iodized

#### IODIZED GARLIC EXTRACT

JPN Translation:

ヨウ化ニンニクエキス

Definition: Iodized Garlic Extract is an extract of Iodized Garlic (q.v.).

Information Sources: JCIC, JCLS, JSQI

Chemical Class: Biological Products

Function: Not Reported

Technical/Other Name:

Extract of Iodized Garlic

Trade Name Mixture:

Raysorgen (Takeyama Garlic)

#### IODIZED HYDROLYZED EXTENSIN

Definition: Iodized Hydrolyzed Extensin is the product obtained by the reaction of Hydrolyzed Extensin (q.v.) with iodine.

Chemical Class: Biological Products

Function: Not Reported

Trade Name Mixtures:

Pronalen A/C HSC (Provital/Centerchem)  
Pronalen Anti-Cellulite HSC (Provital/Centerchem)

#### IODIZED HYDROLYZED ZEIN

Definition: Iodized Hydrolyzed Zein is the reaction product of Hydrolyzed Zein (q.v.) with iodine.

Chemical Class: Biological Products

Function: Not Reported

#### IODOFORM

CAS No. 75-47-8 EINECS No. 200-874-5

Empirical Formula:  
 $\text{CHI}_3$

Definition: Iodoform is the organic compound that conforms to the formula:



Information Sources: 21CFR175.105, 21CFR177.2600, JAN, MI-13(5055), TSCA

Chemical Class: Halogen Compounds

Function: Cosmetic Biocide

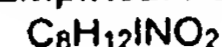
Technical/Other Names:

Carbon Triiodide  
Methane, Triiodo-  
Triiodomethane

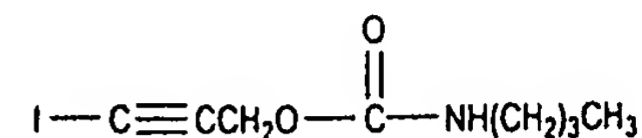
#### IODOPROPYNYL BUTYLCARBAMATE

CAS No. 55406-53-6 EINECS No. 259-627-5

Empirical Formula:



Definition: Iodopropynyl Butylcarbamate is the organic compound that conforms to the formula:



Information Sources: CIR: [SQ] IJT-17 (Suppl. 5)1998, EEC(VI/1-56)

Chemical Classes: Amides; Esters; Halogen Compounds

Function: Preservative

Reported Product Categories: Shampoos (Non-coloring); Hair Conditioners; Hair Dyes and Colors (All Types Requiring Caution Statements and Patch Tests); Hair Preparations (Non-coloring), Misc.; Moisturizing Preparations; Fragrance Preparations, Misc.; Aftershave Lotions; Baby Shampoos; Hair Coloring Preparations, Misc.; Bath Preparations, Misc.; Body and Hand Preparations (Excluding Shaving Preparations); Personal Cleanliness Products, Misc.; Shaving Preparations, Misc.; Bath Oils, Tablets, and Salts; Eyeliners; Hair Shampoos (Coloring); Indoor Tanning Preparations; Tonics, Dressings, and Other Hair Grooming Aids; Bath Soaps and Detergents; Cleansing Products (Cold Creams, Cleansing Lotions, Liquids and Pads); Night Skin Care Preparations; Paste Masks (Mud Packs); Skin Care Preparations, Misc.

Technical/Other Names:

Butyl-3-Iodo-2-Propynylcarbamate  
Carbamic Acid, Butyl-3-Iodo-2-Propynyl Ester  
IPBC

Trade Names:

BIODOCARB C 450 (G+G)  
GlycaciL 2000 (Lonza Inc./Lonza Ltd.)  
GlycaciL L (Lonza Inc./Lonza Ltd.)  
GlycaciL S (Lonza Inc./Lonza Ltd.)  
Liposerve IB (Lipo)  
Solbrol ICG (Bayer)

Trade Name Mixtures:

Biodocarb L 1045 (G+G)  
Dekaben DMM (Dekker)  
Dekaben IGN (Dekker)  
Dekaben LMB (Dekker)  
Dekaben LMP (Dekker)  
Dekaben LMP-5 (Dekker)  
Euxyl K 600 (Schulke & Mayr)  
Germall Plus (Sutton)  
Glydant Plus (Lonza Inc./Lonza Ltd.)  
Glydant Plus Liquid (Lonza Inc./Lonza Ltd.)  
JM ActiCare Plus (Microbial Systems)  
Microcare MGI (Acti-Chem)  
Nipaguard IPF (Clariant)

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# **International Cosmetic Ingredient Dictionary and Handbook**

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**Volume 1**

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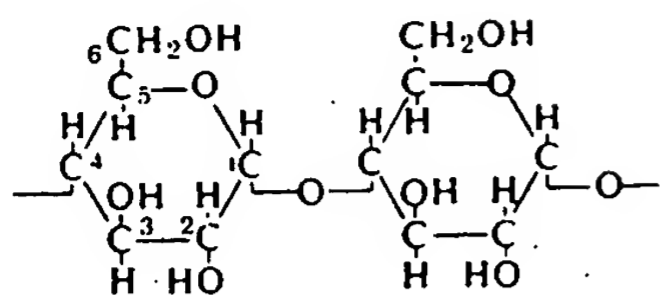
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# APPENDIX 2



It is composed of about 25% amylose (anhydroglucopyranose units joined by glucosidic bonds) and 75% amylopectin, a branched-chain structure.

Properties: White, amorphous, tasteless powder or granules; various crystalline forms may be obtained, including microcrystalline. Irreversible gel formation occurs in hot water; swelling of granules can be induced at room temperature with such compounds as formamide, formic acid, and strong bases and metallic salts.

Occurrence: Starch is a reserve polysaccharide in plants (corn, potatoes, tapioca, rice, and wheat are commercial sources).

Grade: Commercial, powdered, pearl, laundry, technical, reagent, edible, USP.

Hazard: TLV: 10 mg/m<sup>3</sup> in air.

Use: Adhesive (gummed paper and tapes, cartons, bags, etc.), machine-coated paper, textile filler and sizing agent, beater additive in papermaking, gelling agent and thickener in food products (gravies, custards, confectionery), oil-well drilling fluids, filler in baking powders (cornstarch), fabric stiffener in laundering, urea-formaldehyde resin adhesives for particle board and fiberboard, explosives (nitrostarch), dextrin (starch gum), chelating and sequestering agent in foods, indicator in analytical chemistry, anti-caking agent in sugar, face powders, adherent and mold-release agent, polymer base.

See starch-based polymer.

**starch-based polymer.** (1) A reactive polyol derived from a mixture of a starch with dibasic acids, hydrogen-donating compounds, and catalysts dissolved in water; the slurry is subjected to high temperatures and pressures, yielding a low-viscosity polymer in a 50% solids aqueous solution. A molecular rearrangement takes place, and the polymer formed is completely different from starch in structure and properties. It can be further reacted with acids, bases, and crosslinking agents. Suggested uses are in high wet-strength papers, as binders in paper coatings, as moisture barriers in packaging, and as water-resistant adhesives.

(2) Yeast fermentation of starch to form a biodegradable plastic called "pullulan" (a trigluco polysaccharide) has been reported to be commercially feasible.

See "Pullulan."

**starch dialdehyde.** Starch in which the original anhydroglucose units have been partially

changed to dialdehyde form by oxidation, e.g., the product of the oxidation of cornstarch by periodic acid. Available in cationic dispersions up to 15% solids for mixing with paper pulp.

Use: Thickening agent, tanning agent, binder for leaf tobacco, adhesives, wet-strength additive in paper.

**starch-iodide paper.** Indicator paper made by dipping paper in starch paste containing potassium iodide.

Use: To test for halogens and oxidizers such as hydrogen peroxide.

**starch, modified.** Any of several water-soluble polymers derived from a starch (corn, potato, tapioca) by acetylation, chlorination, acid hydrolysis, or enzymatic action. These reactions yield starch acetates, esters, and ethers in the form of stable and fluid solutions and films. Modified starches are used as textile sizing agents and paper coatings. Thin-boiling starches have high gel strength, oxidized starches made with sodium hypochlorite have low gelling tendency. Introduction of carboxyl, sulfonate, or sulfate groups into starch gives sodium or ammonium salts of anionic starches, yielding clear, non-gelling dispersions of high viscosity. Cationic starches result from addition of amino groups.

The glucose units of starch can be crosslinked with such agents as formaldehyde, soluble metaphosphates, and epichlorohydrin; this increases viscosity and thickening power for adhesives, canned foods, etc.

**starch phosphate.** An ester made from the reaction of a mixture of orthophosphate salts (sodium dihydrogen phosphate and disodium hydrogen phosphate) with starch.

Properties: Soluble in cold water (unlike regular starch) and has high thickening power. Can be frozen and thawed repeatedly without change in physical properties.

Use: Thickener for frozen foods; taconite ore binder; in adhesives, drugs, cosmetics; substitute for arabic gum, locust bean gum, and carboxymethyl cellulose.

**starch syrup.** See glucose.

**starch, thin-boiling.** See starch, modified.

**starch xanthate.** A water-insoluble synthetic polysaccharide made by reacting starch with sodium hydroxide and carbon disulfide; biodegradable.

Use: To encapsulate pesticides; the coating, though insoluble, is permeable to water, thus slowly releasing the pesticide. Rubber reinforcing agent.

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soaps; catalyst; soldering flux; sensitizing agent for glass, paper, plastics.

**stannous chromate.** (tin chromate).  $\text{SnCrO}_4$ .  
Properties: Brown powder, almost insoluble in water.

Derivation: Interaction of stannous chloride and sodium chromate.

Hazard: Toxic material. TLV (as Sn): 2 mg/m<sup>3</sup> of air.

Use: Decorating porcelain.

**stannous-2-ethylhexoate.** (stannous octoate; tin octoate).  $\text{Sn}(\text{C}_8\text{H}_{15}\text{O}_2)_2$ .

Properties: Light yellow liquid; insoluble in water, methanol; soluble in benzene, toluene, petroleum ether; hydrolyzed by acids and bases; d 1.25; Gardner color 3 (max).

Hazard: Toxic material. TLV (as Sn): 0.1 mg/m<sup>3</sup> of air.

Use: Polymerization catalyst for urethane foams, lubricant, addition agent, stabilizer for transformer oils.

**stannous fluoride.** (tin fluoride; tin difluoride).  
CAS: 7783-47-3.  $\text{SnF}_2$ .

Properties: White, lustrous, crystalline powder with bitter, salty taste; mp 212–214°C; practically insoluble in alcohol, ether, and chloroform; slightly soluble in water.

Grade: NF.

Hazard: Toxic by ingestion, strong irritant to skin and tissue. TLV (as Sn): 2 mg/m<sup>3</sup> of air.

Use: Fluoride source in toothpastes.

Note: Stannous hexafluorozirconate is said to be more effective than the fluoride in preventing dental caries.

**stannous octoate.** See stannous-2-ethylhexoate.

**stannous oleate.** (tin oleate). CAS: 1912-84-1.  
 $\text{Sn}(\text{C}_{18}\text{H}_{33}\text{O}_2)_2$ .

Properties: Light yellow liquid; insoluble in water and methanol; soluble in benzene, toluene, petroleum ether; hydrolyzed by acids and bases.

Hazard: Absorbed by skin. TLV (as Sn): 0.1 mg/m<sup>3</sup> of air.

Use: Polymerization catalyst, inhibitor.

**stannous oxalate.** (tin oxalate). CAS: 814-94-8.  
 $\text{SnC}_2\text{O}_4$ .

Properties: Heavy, white, crystalline powder; d 3.56; mp decomposes at 280°C; soluble in acids; insoluble in water and acetone.

Derivation: By the action of oxalic acid on stannous oxide.

Grade: Technical, CP, reagent.

Hazard: Absorbed by skin. TLV (as Sn): 0.1 mg/m<sup>3</sup> of air.

Use: Dyeing and printing textiles, catalyst for esterification reactions.

**stannous oxide.** (tin oxide; tin protoxide).

CAS: 21651-19-4.  $\text{SnO}$ .

Properties: Brownish-black powder, unstable in air, reacts with acids and strong bases, insoluble in water, d 6.3, mp 1080°C (600 mm Hg) (decomposes), a nuisance particulate.

Derivation: By heating stannous hydroxide in a current of carbon dioxide.

Grade: Technical, CP.

Use: Reducing agent, intermediate in preparation of stannous salts as used in plating and glass industries, pharmaceuticals, soft abrasive (putty powder).

**stannous pyrophosphate.** CAS: 15578-26-4.  
 $\text{Sn}_2\text{P}_2\text{O}_7$ .

Properties: White, free-flowing crystals; insoluble in water; d 4.009 (16°C).

Use: Toothpaste additive.

**stannous sulfate.** (tin sulfate). CAS: 7488-55-3.  
 $\text{SnSO}_4$ .

Properties: Heavy white or yellowish crystals, soluble in water and sulfuric acid, water solution decomposes rapidly, mp loses sulfur dioxide at 360°C.

Derivation: Action of sulfuric acid on stannous oxide.

Hazard: Toxic material. TLV (as Sn): 2 mg/m<sup>3</sup> of air.

Use: Dyeing, tin-plating, particularly for plating automobile pistons and steel wire.

**stannous sulfide.** (tin monosulfide; tin protosulfide; tin sulfide). CAS: 1314-95-0.  $\text{SnS}$ .

Properties: Dark gray or black crystalline powder, d 5.080; bp 1230°C, mp 880°C, soluble in concentrated hydrochloric acid (decomposes), insoluble in dilute acids and water.

Hazard: Toxic material. TLV (as Sn): 2 mg/m<sup>3</sup> of air.

Use: Making bearing material, catalyst in polymerization of hydrocarbons, analytical reagent.

**stannous tartrate.** (tin tartrate).

CAS: 815-85-0.  $\text{SnC}_4\text{H}_4\text{O}_6$ .

Properties: Heavy, white, crystalline powder; soluble in water; dilute hydrochloric acid.

Derivation: Action of tartaric acid on stannous oxide.

Hazard: Toxic material. TLV (as Sn): 0.1 mg/m<sup>3</sup> of air.

Use: Dyeing and printing fabrics.

**stannum.** The Latin name for tin, hence, the symbol Sn in chemical nomenclature.

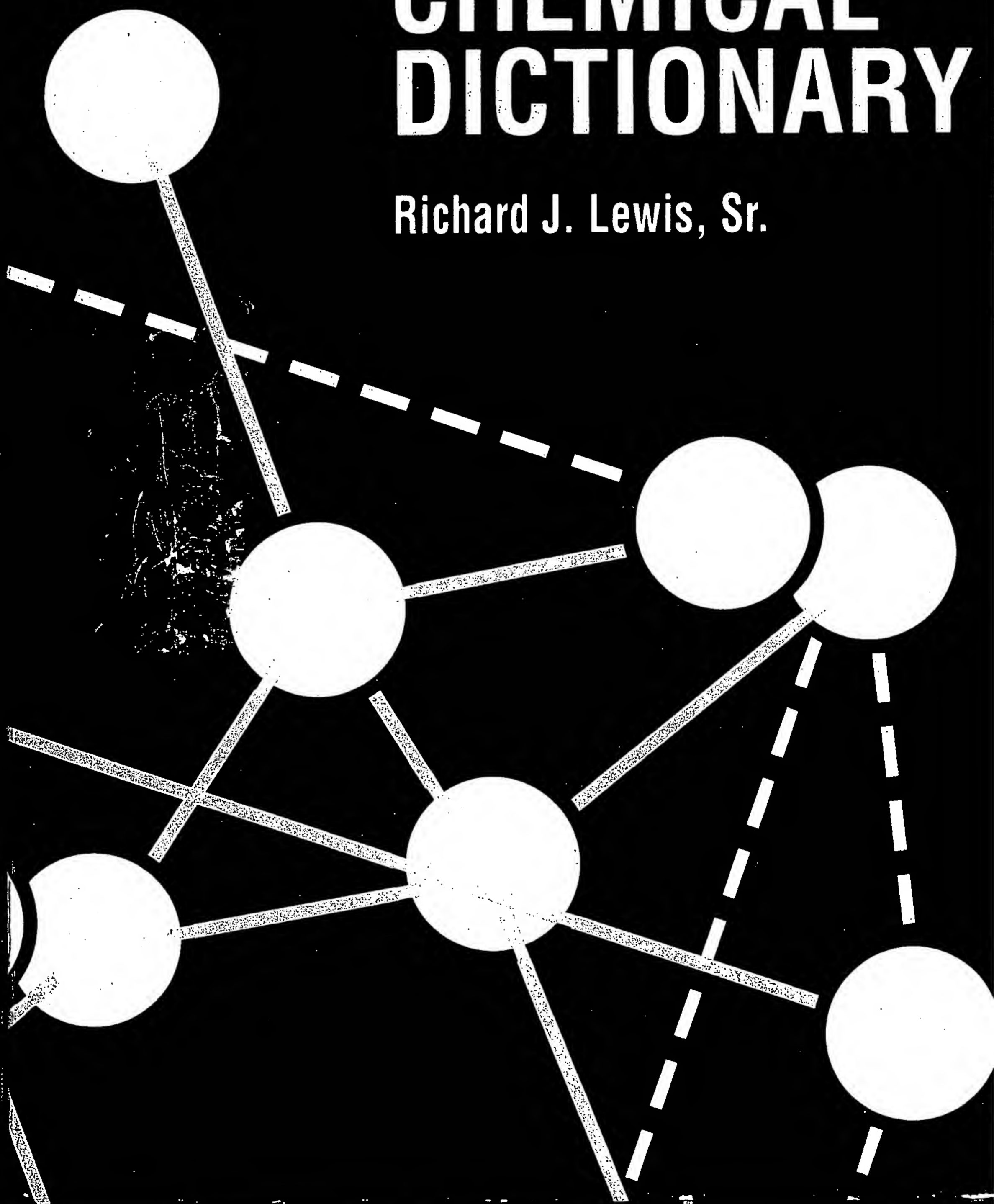
**staple.** Describes a cotton fiber usually in reference to length, i.e., short- or long-staple cotton.

**starch.** CAS: 9005-25-8. A carbohydrate polymer having the following repeating unit:

Twelfth Edition

*Hawley's*  
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Richard J. Lewis, Sr.



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